

4. Contributions to the Anatomy of Passerine Birds.—
Part III. On some Points in the Structure of *Philepitta*,
and its Position amongst the Passeres. By W. A.
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[Received April 15, 1880.]

The doubt which has hitherto prevailed amongst ornithologists as to the true affinities of the very singular Malagash bird for which Geoffroy founded his genus *Philepitta*¹, makes a knowledge of its anatomy, and particularly of its osteology and syrinx, a desideratum. Its original describer considered this genus most nearly related to *Philedon*. Bonaparte, in his *Conspectus*², referred *Philepitta* with some doubt to the Starlings (*Sturnidæ*), placing it near *Dilophus*. The late Mr. Gray, in his *Hand-list*³, made it a genus of *Pittidæ*, *Pitta* being the only other genus of that family recognized by him.

Mr. Sharpe in 1870⁴ suggested that it ought to be regarded as an aberrant genus of the *Paradisidæ*, forming a subfamily which he proposed to call *Philepittinæ*.

That neither this position nor those assigned to it by Geoffroy or by Bonaparte can be accepted is evident from the fact that, as shown by Sundevall⁵, *Philepitta* possesses a long 10th ("first"⁶) primary, at the same time that the tarsus is *not* bilaminate. The Swedish naturalist last mentioned made his subfamily *Paictinæ* (he having rechristened *Philepitta* *Paictes*) the first in the fifth cohort, "*Taxaspidæ*," of his "*Oscines Scutelliplantares*," the others being the *Thamnophilinæ*, *Myrmornithinæ*, *Hpysibamoninæ*, and *Scytalopodinæ*, in which last *Menura* was also included—a striking illustration of the unsatisfactory results that a classification founded on external characters only always leads to.

More recently, M. Alphonse Milne-Edwards has figured the two known species of *Philepitta*, as well as the tongue and osteology of *P. castanea*, in Grandidier's magnificent work on Madagascar⁷. In this work (the plates only of the part in question having been issued) he places it next to the *Nectariniidæ*, apparently on account of the eye-wattle of the male and the bifid tongue approximating it to such a form of that group as *Neodrepanis*. Having written to M. Milne-Edwards to ask if he had examined the syrinx or other soft parts of the bird under discussion, he was kind enough to reply by sending me the viscera, including the trachea &c., of a specimen (in all probability *P. castanea*), and by generously granting me permission to make any use of them I liked. He also informs me that in the text to the plates he has fully described the osteology.

¹ Mag. Zool., Ois., pl. 3, 1839.

² *Op. cit.* p. 422.

³ *Op. cit.* i. p. 297, gen. no. 1094.

⁴ P. Z. S. 1870, p. 397.

⁵ Tentamen, p. 63.

⁶ See P. Z. S. 1879, p. 256, note.

⁷ Hist. Phys. Nat. et Polit. de Madagascar, tome iii. Oiseaux, Atlas ii, 1^{re} partie, pls. 109–112.

As regards this part of the structure of *Philepitta*, I only wish to remark on and give a figure of the palate, extracted from a skin of *P. castanea* by Prof. Garrod, M. Milne-Edwards's figure of this (pl. 112. fig. 2a) being rather indistinct in some important points. As will at once be seen, the vomer is truly Passerine, being split behind and truncated in front; to its outer and anterior angles are articulated two small nodules of bone, probably corresponding to the "septo-maxillaries" of Prof. Parker. The maxillo-palatines are slender, long, recurved apically, and pointed backwards; the transpalatines are distinct and slightly curved inwardly, and the palatines tend to diverge behind. In *Pitta* (*cyanura*) the vomer is proportionally broader, the maxillo-palatines are much shorter and broader and more transversely directed, and the palatines are nearly parallel to each other throughout¹. In the *Eurylæmidæ*² the maxillo-palatines, though slender, are nearly transverse to the axis of the skull, and the "transpalatines" tend to become obsolete.

Fig. 1.

Palate of *Philepitta castanea* (nat. size).

Judging from M. Milne-Edwards's figure (*l. c.* pl. 112. fig. 3), the manubrium sterni is but slightly bifid, therein approaching that of the *Eurylæmidæ*.

As regards other points, in its pterylosis *Philepitta*, which was one of the few important forms unexamined by Nitzsch, is perfectly Passerine. There is a longish oval ephippial saddle, with a large space, much as in some of the *Eurylæmidæ* (*vide suprâ*, p. 381); in *Pitta*, according to Nitzsch, the saddle is undivided. But *Philepitta* differs from the *Eurylæmidæ*, and agrees with all other Passeres, in the absence of any vinculum in the deep plantar tendons, as was ascertained by Prof. Garrod from the examination of a skin, and recorded by him in MS.

¹ Cf. Prof. Parker's fig. of *Pitta melanocephala*, Trans. Zool. Soc. ix. pl. lvi. figs. 6, 7. In this species the "transpalatine" processes are far less developed than in *P. cyanura*.

² Figures of the palates of *Eurylæmus ochromelas* and *Calypptomena viridis* are given in Prof. Garrod's paper, P. Z. S. 1877, p. 449.

As regards the alimentary canal, there is nothing peculiar. The tongue, in the specimen forwarded from Paris, was removed; but, as we know from M. Milne-Edward's figure, it is triangular and bifid at the end. There is no crop developed; and the zonary proventriculus is half an inch deep. The stomach is a strong gizzard, rather elongated in shape, with thick and considerably plicated epithelium. The liver is unequiloled, the left lobe being half the size of the right; it has a gall-bladder. The total length of the intestines is seven inches, of which the last half-inch is large intestine. The cæca are truly passerine, being mere nipples, and rather widely separated.

The syrinx of *Philepitta* being hitherto entirely unknown, I herewith give a description and figures of it.

Fig. 2.

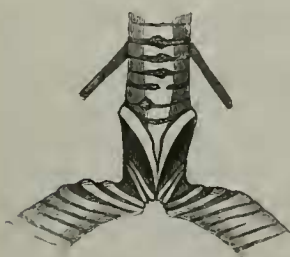


Fig. 3.

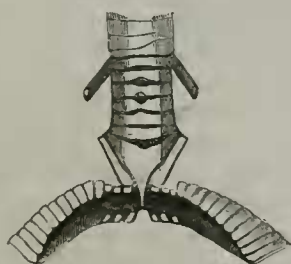


Fig. 4.



Fig. 2. Syrinx of *Philepitta*, from before. Fig. 3. The same, from behind.

Fig. 4. The same, from the right side. (These figures are magnified about 4 times.)

The trachea is slightly laterally compressed below; the rings, which are complete, are somewhat irregular in shape, owing to the greater or less development of the notchings on their borders. In front, of the last few rings preceding the terminal one, two or more are joined together by vertically directed bars, which makes it difficult to count their number with exactitude. Behind, however, they are all free. The terminal tracheal ring is narrow laterally, and closely apposed to the first bronchial semirings; in front and behind it is produced downwards triangularly, and behind bears a well-developed forwardly directed narrow pessulus. As seen from behind, therefore, the terminal tracheal ring has somewhat the shape of an arrow-head. The narrow sterno-tracheales are inserted on about the last ring but six. The first bronchial semirings are thickened, and very much arched, being concave downwards. As seen from the side (fig. 4) they are more strongly convex anteriorly than posteriorly. The second and third semirings are very slender indeed, closely approximate, much shorter and much less concave downward, so that a large membranous fenestra is left between them and the first semirings. The fourth and fifth semirings are also slender, but less so than the last two: they are slightly concave upwards, so that

a second, though shallower, fenestra is formed between them and the second and third pairs. The fifth semirings are slightly dilated at their extremities, where they are in close proximity, before and behind, with the first four pairs. The sixth and succeeding bronchial rings take on the ordinary character, being deeper than those that precede them, and gradually becoming more complete, till the fifteenth pair are nearly perfect. On one side, the left, in this specimen, the eighth and ninth semirings are partially fused externally.

The lateral muscles of the trachea, after the insertion of the sternotracheales, become excessively thin, so that it is difficult to make out accurately their exact extent. They apparently fan out, so as to be nearly in contact with each other before and behind, and are inserted onto the first bronchial semirings for the greater part (as far as I can make out) of their *lateral* surface, the *tips*, however, being quite free from muscular fibres.

Philepitta is therefore perfectly Mesomyodian, as Prof. Garrod predicted would probably be the case¹.

There are thus three families of Mesomyodian Passeres in the Old World—the *Pittidæ*, the *Philepittidæ*, and the *Eurylæmidæ*. All agree in the possession of a broncho-tracheal syrinx, in that respect agreeing with the *Cotingidæ* (including *Rupicola*), *Pipridæ*, and *Tyrannidæ* of the New World, and differing from the Tracheophone families, which are all, as is well known, American. *Philepitta* differs in the details of its syrinx from all the other "Haploophone" Passeres. In *Pitta* (*cf.* P.Z.S. 1876, pl. 53. figs 1-6) the bronchial semirings are much less modified, being nearly entirely simple semirings; the lateral muscle, too, is slender and not spread out as in *Philepitta*. This fact, taken with others, as the scutellation of the tarsi, osteology, &c., justifies, in my mind, the establishment, as has been done by Sundevall under the name *Paictidæ*, of a separate family for the bird under consideration². The *Eurylæmidæ* differ in their retention of a plantar vinculum (*cf.* Garrod, P.Z.S. 1877, and *suprà*, p. 382), as well as in the structure of their feet and other points. In the form of their syrinx, however, they approach *Philepitta* perhaps more nearly than any form yet described, though in them too the lateral muscle remains slender and unexpanded. The peculiarities of the *Eurylæmidæ*, and especially their oft-spoken-of retention of the plantar vinculum, are sufficient, I think, to justify their forming a main division of Passeres by themselves, as suggested by Prof. Garrod³, which may be termed DESMODACTYLI in distinction from the others or ELEUTHERODACTYLI. Prof. Garrod's arrangement of Passeres⁴ may therefore be modified as follows:—

¹ Voice-organs of Passeres, p. 68.

² The general myology and vascular system of *Philepitta* are still, it must be remembered, unknown, but are in all probability perfectly Passerine.

³ Voice-organs of Passeres, p. 73 and P. Z. S. 1877, p. 449.

⁴ P. Z. S. 1876, p. 518.

PASSERES.	{	i. DESMODACTYLL. (The plantar vinculum retained; manubrium sterni not forked.)	New World.	Old World.
				<i>Eurylæmidæ.</i>
	{	ii. ELEUTHERODACTYLL. (The plantar vinculum lost; manubrium generally strongly forked.)		
	A. Mesomyodi.			
	HETEROMERI.		<i>Pipridæ.</i> <i>Cotingidæ.</i>	
	HOMŒOMERI ¹ .			
	Haploophonæ.		<i>Tyrannidæ.</i> <i>Rupicola.</i>	<i>Philepittidæ.</i> <i>Pittidæ.</i>
	Tracheophonæ.		<i>Dendrocolaptidæ.</i> <i>Furnariidæ.</i> <i>Pteroptochidæ.</i>	
	B. Acromyodi.			ABNORMALES. <i>Atrichiidæ.</i> <i>Menuridæ.</i>
				NORMALES.

Till more material has been examined, it is impossible to say whether or not some of the points in the above classification fairly express the affinities of the various groups treated of. This appears to me particularly the case as regards the primary division of the Mesomyodi into Hetero- and Homœomeri, depending as it does on the presence of the femoral or the sciatic artery respectively.

The pseudo-schizorhinal character of the skull also in some of the Tracheophonæ² may necessitate an ultimate arrangement of that group different from that here adopted (taken from Messrs. Sclater and Salvin's 'Nomenclator').

As regards the Passeres whose anatomy still remains unknown, the forms that most require examination are *Phytotoma* and *Oxyrhamphus*³ of the New, and *Orthonyx* and *Melampitta* of the Old World. The last may be, as suggested by Mr. Gould⁴, a link between *Pitta* and *Philepitta*; Count Salvadori⁵ on the other hand, is inclined to regard it as a *Timeliina* and therefore a normal (Oscine) Acromyodian form. It is also highly desirable to obtain some knowledge of the soft parts of some of the larger forms usually placed amongst the *Cotingidæ*, especially *Ptilochloris* and *Phænicoercus* (placed by Sundevall with *Rupicola*), as well as of *Gymnoderus*, *Querula*, *Cephalopterus*, &c.

¹ I place *Philepitta* only provisionally amongst the Homœomeri, presuming that, as in all Passeres but the *Pipridæ* and *Cotingidæ* (minus *Rupicola*), the artery of the leg is the sciatic.

² Cf. Garrod, P. Z. S. 1877, p. 452, &c.

³ Very imperfectly described by Eyton and Eydoux and Souleyet, cf. Joh. Müller, Stimmorgane, &c., p. 8.

⁴ B. New Guinea, pt. ii. (1876).

⁵ Ann. Mus. Civ. Gen. x. p. 147.